**Must-Knows: Unit 5 (Photosynthesis)**

Ms. Ottolini, AP Biology

**Test Format:** 22 multiple choice questions, 1 short answer question

***Directions:*** *To prepare for your upcoming test, please answer the following questions thoroughly and accurately on your answer sheet in the column titled “Your Answer Before Checking the Answer Key.” Then, check the answer key (posted on Ms. Ottolini’s wiki page). Finally, record any additions / changes to your answer in the column titled “Changes / Additions to Your Answer After Checking the Answer Key”*

**Topic #1: Step 1 of Photosynthesis – The Light Reactions**

***Learning Target #1:***  I can explain how light energy is captured in the chloroplast and sent to the Calvin Cycle.

***Learning Target #2:***  I can identify the parts of the chloroplast and molecules involved in the Light Reactions.

1. What pigments are found in the thylakoid membranes? What is their role in the light reactions of photosynthesis?
2. What colors of light are most ABSORBED by chlorophyll a? What color of light is most REFLECTED by chlorophyll a?
3. What happens to water during the light reactions of photosynthesis?
4. What is the goal of cyclic electron flow?
5. What role do the electron transport chains in the thylakoid membrane play in the creation of a proton motive force? How is the proton motive force used?

**Topic #2: Step 2 of Photosynthesis – The Calvin Cycle**

***Learning Target #3:***  I can explain how energy from the Light Reactions is used in the Calvin Cycle to make glucose.

***Learning Target #4:***  I can identify the parts of the chloroplast and molecules involved in the Calvin Cycle.

1. What is the main goal of the Calvin cycle?
2. Describe the relationship between the light reactions and the Calvin cycle.
3. What are the reactants and products of the Calvin cycle?
4. Where in the chloroplast does the Calvin cycle occur?

**Topic #3: Exceptions to Normal Photosynthesis**

***Learning Target #5:***  I can discuss the purpose of C4 and CAM photosynthesis.

***Learning Target #6:***  I can compare and contrast C4 and CAM photosynthesis with normal (C3) photosynthesis.

1. What occurs during photorespiration? Why is this an issue for plants?
2. How do C4 plants minimize photorespiration?
3. How do CAM plants minimize photorespiration? Why do CAM plants keep their stomata closed during the daytime?

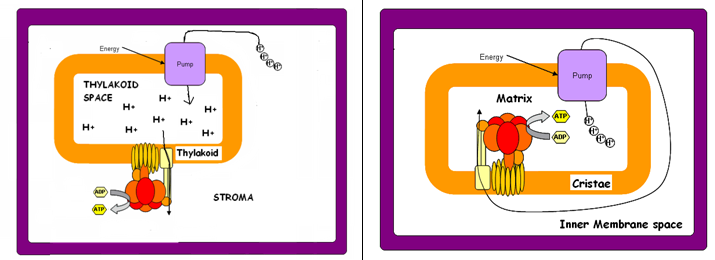
**Topic #4: Comparing Photosynthesis with Celluar Respiration**

***Learning Target #7:***  I can compare and contrast the overall chemical equations for photosynthesis and cellular respiration and describe how these processes work together as a cycle.

***Learning Target #8:***  I can identify the types of organisms that use photosynthesis, cellular respiration, or both.

***Learning Target #9:***  I can compare and contrast the purpose and process of the electron transport chain in chloroplasts and mitochondria.

1. Why are photosynthesis and cellular respiration often thought of as a cycle? Write out the full, balanced chemical equation for each process and compare them.
2. What types of organisms have chloroplasts? What types of organisms have mitochondria?
3. Compare / contrast the electron transport chain in the mitochondrion vs. chloroplast in terms of the electron carriers used to “drop off” electrons, the direction of H+ pumping, the creation of an electrochemical gradient, the synthesis of ATP, the final electron acceptor, etc. How are they similar? How are they different? You can use the diagram below to assist you.



***\*\*\*Note: On your test, there will be three “Science Skills” multiple choice questions where you will be asked to analyze a graph or chart showing photosynthesis data. Though the questions are related to photosynthesis data, you really only need to use critical thinking skills to find the answers.\*\*\****